NO 7501

"FLEXIBLE PACKAGING AND METHOD OF MANUFACTURE"

FIELD OF INVENTION

This invention relates to flexible packaging units intended to be opened by tearing and to means for controlling the opening by tearing. The invention provides a method of constructing a flexible packaging unit to facilitate controllable opening thereof by tearing. Further, the invention provides a flexible packaging unit incorporating tear control means for facilitating its controllable opening.

BACKGROUND OF THE INVENTION

Being able to control the opening of a flexible container such as a plastic bag or pouch is important to consumers, especially where the contents are likely to mess if spilt. Means for controlling the direction of tearing of a tearable packaging unit have been previously proposed. In US 5,186,543 there is disclosed an easy-open flexible container having guide strips respectively located on either opposed side wall and a tear strip located at the apex of the container. Extending from the tear strip to each guide strip is an opposing tear area defined on each wall. Tearing is limited to these areas when the consumer takes hold of and pulls the tear strip from one side to the other. A drawback of this invention is that a special tear strip has to be provided and incorporated into the construction.

European patent EP 0471220 discloses a pouch having a thin-walled part for easy tearing, the thin wall part incorporating strings in the plastic film that makes up the wall; the strings being pullable to open the pouch. A drawback of this invention too is the requirement of providing special elements, in this case the strings, adding complexity to the manufacture thereof.

NO 7501

EP 0325993 describes a bag having a tear strip that is defined by parallel perforated lines. The perforations are backed by a sealing strip to maintain the hermetic integrity of the bag's interior. Again, this invention has the drawback of increasing complexity of manufacture.

EP 0423456 discloses a bag having zipper means rendering it reclosable and a tear strip for facilitating the initial opening. The tear strip can be located internally and externally at the apex of the bag. Protection against unwanted propagation of the tear towards the zipper elements is achieved by providing the zipper elements each with an extended base portion to reinforce the film of the walls and to keep the tear from reaching down to them. This invention adds further to the material requirements for manufacture.

There is a need for a bag or other flexible container construction of simple, yet having means of preventing propagation of an initial tear in an undesired direction or area.

An advantage of the present invention is to provide a container having a bounded tear area in which tearing is confined in a construction that avoids having a tear strip. By setting limits to the area available for tearing and defining such area entirely within a wall of the container, the problem of the tear propagating off the top edge of the container, leaving the mouth not completely opened, is avoided.

An advantage of the present invention is to provide barrier means for preventing the tear from propagating to the top edge of the container.

SUMMARY OF INVENTION

According to a first aspect of the invention, there is provided a flexible container comprising opposed front and back walls sealed together proximate to their edges to define an internal space, a pair of tear-limiting strips applied to a surface of each wall or located within each wall so that the strips on or within opposed walls coincide substantially, defining corresponding tear paths.

NO 7501

To be tear-limiting, the strips have substantially greater tear resistance than the walls.

In a preferred form of the invention, the strips of each pair are spaced from about 0.1mm to about 6mm apart, preferably about 1mm-2mm and further preferably from about 1.2mm to 1.8mm.

In a further preferred form of the invention, the strips of each pair are located to be substantially parallel to each other.

In an embodiment, the strips comprise sealable strips.

In an embodiment, the strips are self-adhesive.

In a still further preferred form of the invention, the strips are about 1mm to about 5mm in breadth, preferably from about 1.5mm – 2.5mm.

Further according to the invention, the strips may all be located on the outer surface of the walls. Alternatively, the strips are all located on the inner surface of the walls. In an embodiment, one pair of strips is located on an inner wall surface and the other on an outer wall surface. In another embodiment, one strip in each pair is located on an inner surface and the other strip is located on an outer surface of each wall. In the event the wall is comprised of a laminate material, a strip may be located to be on a surface between laminate materials making up the wall material.

In preferred embodiments, the thickness of the strips is in the range from about 12 – 100 microns, preferably about 20-50 microns.

Further according to the invention, the strips are made of polypropylene (PP). Alternatively, the strips may be made of polyethylene (PET).

NO 7501

According to a second aspect of the invention, there is provided a flexible-walled container having opposed back and front walls, each wall having a respective top edge, the walls being sealed together proximate to the respective top edges defining an internal space between them, and tear barrier means provided on or within each wall, defining a tear path located to be spaced from at least a part of the top edge thereof

In a preferred form of the invention, the tear paths are defined by paired spaced barrier strips resistant to tearing.

According to a third aspect of the invention, a method of manufacturing a flexible walled container comprises the steps of providing first and second films, providing tear barrier material in strip form, applying the tear barrier material in paired strips to each film so as to define a substantially coinciding tear path on each and arranging the films in opposition to form a container comprising substantially coinciding tear paths on each wall.

The invention further provides a method of manufacturing a sealable bag, the method comprising the steps of providing a flexible film and forming it into a container defining an internal space bounded by respective front and back walls, and applying a tear barrier strip to the walls to define a bounded tear path on each of the front and back walls.

In all embodiments of the invention, the tear barrier is of substantially greater tear resistance than the flexible film to which it is applied.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 presents in A a side view of an embodiment of a flexible container of the invention and in B a cross section of the container along line A-A'.

Figure 2 is a side view of an alternative embodiment of the invention.

NO 7501

Figure 3 is a side view of a further alternative embodiment of the invention.

Figure 4 is a schematic illustration of a process of manufacture of a container according to the invention.

DETAILED DESCRIPTION OF EMBODIMENTS

The invention provides for the definition of substantially coinciding tear paths on opposing walls of a flexible packaging unit made of a tearable film, for example a film of plastics material or a laminate. The tear path is designed to facilitate the opening of the container in a controllable manner by a consumer desirous of accessing the contents. By limiting the propagation of the opening tear to a defined path, a cleaner open may be obtained and the likelihood of spillage, waste and messing reduced. The packaging unit may be a pouch container or a bag or the like.

The tear paths are defined by applying tear limiting elements in the form of barrier strips in pairs to the surfaces of the container walls or to sheets in laminated material making up the walls. Preferably the strips are substantially parallel to each other. The barrier strips may be applied to the inner or outer surfaces of the container and in any combination. In a preferred embodiment, the strips are all applied to the outer surfaces at corresponding positions. However, they may also be applied to the opposing inner surfaces. Alternatively, one pair may be applied to an inner surface and the other to the outer surface of the opposing wall. In an embodiment, one strip in a pair may be applied to an outer surface while its partner may be applied to the inner surface of the same wall. Where the wall is constructed of a laminate material, one of more of the strips may be located between adjacent layers in the laminate.

The strips are preferably spaced apart from about 0.1mm to about 6mm and further preferably from about 1mm to about 2mm. In a particularly preferred embodiment, the strips are spaced apart by about 1.3mm to about 1.8mm.

NO 7501

By narrowing the spacing between the strips in each pair and by making the positioning of the pairs coincide on the opposing walls, a near perfect tear line is achievable with the tear paths on the opposing walls almost exactly superposed.

The strips are comprised of tear tape that is sealable or preferably self adhesive. Each strip desirably may have a width in the range from about 1mm to 5mm, preferably from about 1.5mm to about 2.5mm. Desirably the strips have a thickness in the range from about 12 microns to 100 microns, preferably from about 20 to about 50 microns. Factors such as strip thickness, strip width and grade of strip tape material will determine the strip tear resistance in comparison with the tear resistance of the film from which the container is fashioned.

In the case where the containers are to be retorted or subjected to a form of heat treatment, the strips are preferably made of polyester or polyethylene (PET). Where the containers are intended to house a dry product and not be subjected to a retort stage, they may conveniently be made from polyproylene (PP) tape. Polyester tape may however also be used, as may other suitable tape materials known in the art.

The pouches may conveniently be of the doypack type or be 3- or 4-sidedly sealed pouches. However, other pouch configurations may be employed. The pouch material may be PP, PET and laminates comprising two or more of PP, metallised foil, e.g. aluminium foil (Alu), poly-acrylamide (PA), PET, fibre sheeting, such as paper, and PE. Preferably it will be a 3-layer laminate of PET/Alu/PP for retorted product applications, and PET/PP or PP/PE for dry product applications. Further layers may be added, depending on the product application and processing and the degree of tear resistance required in comparison with the tear-limiting strips to be applied.

To facilitate the initiation of a tear, a notch may be formed at an edge of the container wall. Alternatively, a hole may be punched at a suitable location where the opposed walls are sealed together. The notch or hole is sealed around its edges to maintain the airtight integrity of the container. The tear limiting tape strip may be applied to each side of the notches or punched holes.

NO 7501

The flexible container 10 illustrated in Figure 1 has opposing walls 12, 14 sealed together at region 16, proximate to top edges 18, 20. Below region 16 and spaced from top edges 18, 20 is barrier strip 22, 24 applied externally to the wall 12, 14. Spaced from barrier strip 22, 24 is a second barrier strip 26, 28. Between the upper and lower barrier strips is defined thus a tear area 30, 32. A notch 34 is provided to facilitate initiation of a tear in the tear area. When a tear 36 is initiated in tear area 30, 32, it is forced to propagate in that tear area defined by the barrier strips, and not stray beyond. The direction and extent of tearing is thus controllable.

Figure 2 illustrates in cross section an embodiment of laminated wall sections to which barrier strips are applied, according to the invention. Like numerals are applied to denote like features appearing in figure 1. In this embodiment, tear barrier strips 22, 24, 26 and 28 are located internally in walls 12 and 14, being placed between adjacent layers of aluminium foil 38 and polypropylene 40. An external layer 42 of polyethylene PET is applied over the aluminium foil 38. The layers are sealed together at heat seal 44.

Figure 3 illustrates a further exemplary embodiment, in which the barrier strips 22, 24, 26 and 28 are placed externally to the container, being applied as self adhesive tape to the outer polyethylene surfaces of layers 42.

A wall material for a tearable flexible container of the invention may be manufactured by providing a flexible film for forming a wall of the container, such as a laminate of alufoil and polyethylene, providing a tear barrier element having substantially greater tear resistance than the wall film, for example a polypropylene tape, locating the element on the film to define a tear path thereon, and fixing the element to the film. The barrier element in strip form may be adhered to the film through use of an adhesive, or may be thermally bonded to it.

Figure 4 illustrates a method of manufacturing a laminated flexible sheet material foil for use in forming the bag of figure 1. In the illustrated exemplary embodiment, the

NO 7501

walls 12, 14 are constructed of a laminated sheet comprising a foil 42 on a polyethylene film 44. The tear barrier comprises polyethylene strips 22, 26 applied to the foil 42. The foil is preferably metallised and may for example be an aluminium foil ("alufoil").

In a preferred embodiment, as the laminated sheet 40 is moved by means of a conveyor system, the barrier strips are of polyester and optionally covered by a layer 46 of polypropylene extruded over them. In figure 2, the polypropylene layer 46 is applied by means of an extrusion hopper 48. Irregularities 50 in layer 46 are smoothed out by passing the layer under a correcting roll 52. The adhesive on the strip is a self-adhesive material delivered in reel. No high temperature treatment is needed for the application which is done by simple contact by unwinding a tape while unwinding the film. The strip and its applicator are obtainable from the company PP Payne of Nottingham, England.

An advantage of the invention is that it provides a highly reliable guided tear in both opposing walls of the container, along a bounded path leading from one edge to another, be it from a side edge to the opposite side edge or from the top edge to a side edge or from a side edge to a defined part of the top edge.

A further advantage is that the package and the guide strips defining the tear path are all retortable.